REMARKS

Claims 1-26 are pending. Claims 4, 5, 12, 19-21, 24 and 25 are withdrawn. Applicants gratefully acknowledge that claims 23 and 25 are allowed and that claims 3, 9-11 and 16-18 are allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims.

Claim Rejections

Claims 1, 13, 14 and 22 were rejected under 35 U.S.C. 103(a) as being unpatentable over ***Otsuka*** (JP 2000-174505, disclosed in the IDS filed July 5, 2005) in view of ***Sochoux*** (U.S. Patent 6,271,678); and Claims 1, 2, 6-8 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Otsuka* in view of ***Fukaya*** (US Patent 5,955,938).

In the present invention, the resistance of the bus terminal resistor provided at the terminal end is set to match the characteristic impedance of the bus. This prevents reflected waves from occuring. As a consequence, when a terminal resistor is considered a pure resistance, there is substantially no problem of reflection.

However, the chip type terminal resistor, inevitably by its composition, has inductance (referred to as L) and capacitance (referred to as C). By the resonance of L and C, high harmonic frequency components of the digital signal and apparent high frequency components associated with the transition time are amplified. These amplified high frequency components cause distortion to the pulse waveform of the high frequency digital signal being transmitted.

In the present invention, on the bus from the start terminal to the end terminal, the high frequency digital signal is transmitted with only little distortion to the pulse waveform. Therefore, on the bus, a digital signal including high harmonic frequency components, apparent high frequency components associated with the transition time and the base frequency components is transmitted.

The digital signal arrives at the terminal end of the bus then ends its role. Consequently, in this invention, the terminal end of the bus is terminated, for absorbing the energy by the digital signal or by the resonance of the LC of the chip type terminal resistor.

A. Rejections based on *Otsuka* in view of *Sochoux*

1. High Frequency Electromagnetic Energy Entering said Bus and Reaching said One End.

Applicants respectfully submit that neither *Otsuka* nor *Sochoux* disclose:

> said insulator is adapted to absorb and dissipate high frequency electromagnetic energy of high harmonic frequency components of said digital signal and of apparent high frequency components associated with transition time, **said high frequency electromagnetic energy entering said bus and reaching said one end**

as recited in claims 1 and 22 (emphasis added).

Sochoux discloses a source terminator device, in which a signal is transmitted from source to load via a transmission line. By providing this source terminator device, EMI (electro magnetic interference) from the transmission line is decreased. The decrease of the EMI consequently suppresses high frequency components. In order to decrease the EMI from the

transmission line, **high frequency components are suppressed by the source terminator device**.

In *Sochoux*, high frequency components included in the transmitted clock signal are suppressed causing the waveform of the clock signal to be distorted.

In the present invention, all the frequency components (high frequency component energy including base frequency components of the digital signal, high harmonic frequency components, and apparent high frequency components associated with the transition time) are transmitted on the bus and their decrease is limited to a minimal amount. The EMI possibly occurring from the bus is not considered. Furthermore, no reflection occurs for the digital signal arriving at the terminal end of the bus. Thus, the digital signal transmitted from the start terminal to the end terminal on the bus is not distorted.

The Examiner stated:

> since the combination [of *Otsuka* and *Sochoux*] results in the same structure as the presently claimed invention, as an obvious consequence of the combination it is adapted to be capable for functioning in the same manner.

(Office Action, September 22, 2005, page 4.) However, *Sochoux* in fact discloses a different structure as compared to the present invention, *e.g.*, *Sochoux* discloses a source terminator device.

Neither *Otsuka* nor *Sochoux* disclose high frequency electromagnetic energy entering said bus and reaching said one end as recited in claims 1 and 22.

2. The Insulator having a Larger Dielectric Loss Angle

Applicants respectfully submit that neither *Otsuka* nor *Sochoux* discloses "an insulator having a larger dielectric loss angle at least in the frequency region of said digital signal than said insulative substrate" as recited in claims 1, 6, 7 and 13.

In the present invention, dielectric loss angle of the substrate is preferably small, in order to limit the decrease to a minimal amount while transmitting all the frequency components included in the digital signal. Further, an insulator around or in the vicinity of the terminal resistor preferably has a larger dielectric loss angle than the insulative substrate.

This idea is not taught in either *Otsuka* or in *Sochoux*.

The Examiner stated:

> since *Sochoux* is silent as to the particular ferrite material and especially since the ferrite is for absorbing EMI, one of ordinary skill in the art would have been motiviated to select the absorbing ferrite material to have a higher loss factor than the substrate so as to provide the advantagesous benefit of EMI reduction in addition to the substrate material.

(Office Action, September 22, 2005, page 4.) However, there is nothing in *Sochoux* or *Otsuka* that teaches that using ferrite material having a higher loss factor than the substrate provides an advantageous benefit. The Examiner appears to be using hindsight based on the present specification to find that it would have been obvious to use such material with the resistors of *Otsuka* for providing the benefit of EMI reduction.

The Examiner also stated that "substrate materials are commonly made of low loss materials such as alumina (i.e. much lower than ferrites)." (Office Action, April 4, 2005, page

5). However, this does not explain how it would have been obvious to use an insulator having a larger dielectric loss angle than the insulative substrate. Therefore, neither *Otsuka* nor *Sochoux* teach or suggest an insulator having a larger dielectric loss angle than the insulative substrate as recited in claims 1, 6, 7 and 13.

3. The Insulator in the Vicinity of the Resistor is Mixed with Magnetic Material.

Applicants respectfully submit that neither *Otsuka* nor *Sochoux* discloses "providing in the vicinity of said terminal resistor an **insulator** mixed with magnetic material in the vicinity of the terminal resistor" as recited in claim 22 (emphasis added).

The Examiner alleged that the ferrite magnetic material of *Sochoux* is an insulator. In addition, the Examiner alleged that *Sochoux* discloses doping the ferrite material with an insulative material. (Office Action, April 4, 2005, page 3.)

The Examiner cited the following passage of *Sochoux* in support of this argument:

> One embodiment [of] the present invention is implemented by configuring a ferrite bead to provide a substantial low-frequency resistance (such as by fabricating a ferrite bead having a constricted region **and/or doping with materials having less conductivity**) so that a single device provides both the high frequency impedance function of a typical ferrite bead and the low frequency resistance features desired.

(*Sochoux*, col. 5, lines 17-26, emphasis added.)

In Applicants' previous arguments, it was stated that this disclosure in *Sochoux* implies that the ferrite bead is conductive since the ferrite bead is doped with materials that are less conductive than the ferrite bead. (Amendment, July 5, 2005, page 15.)

In response, the Examiner states that *Sochoux* discloses a ferrite bead as a resistance device. The Examiner also states:

> material having low conductivity can be considered an insulator since the term "insulator" means to be a poor conductor and thus inherently the material having less conductivity can be considered a poor conductor since it is less conductive than a resistive material which by definition can be considered a poor conductor (i.e. insulative).

(Office Action, September 22, 2005, page 6).

The Examiner appears to incorrectly interpret *Sochoux*. *Sochoux* discloses "doping [a ferrite bead] with materials having **less** conductivity." (Emphasis added). A material that has less conductivity than the ferrite bead does not necessarily have low conductivity. The Examiner assumes that less conductivity means low conductivity.

Therefore, neither *Otsuka* nor *Sochoux* disclose an insulator mixed with magnetic material in the vicinity of the terminal resistor" as recited in claim 22.

Accordingly, withdrawal of the rejection based on *Otsuka* in view of *Sochoux* of claims 1, 13-14 and 22 is hereby solicited.

B. Rejections based on *Otsuka* in view of *Fukaya*

1. The Insulator having a Larger Dielectric Loss Angle

Applicants respectfully submit that neither *Otsuka* nor *Fukaya* disclose "an insulator having larger dielectric loss angle at least in the frequency region of the digital signal than the insulative substrate" as recited in claims 1, 6, 7 and 13.

Fukaya utilizes a paste with RuO_2 added for the glass composition element. The resistor is composed by printing this paste on the surface of the substrate. Therefore, the resistor of *Fukaya* is not a chip type resistor like in the present invention. As a consequence, parasite L and parasite C would not be much problem. This point is basically different from the invention.

Glass overcoat of *Fukaya* is aimed to protect a printed resistor or to improve the resistance. Therefore, such glass overcoat only needs to have a performance for "resistor's protection or resistance." As a result, as for the glass overcoat of *Fukaya*, there is no disclosure about having a large dielectric loss angle, nor about absorbing high frequency electromagnetic energy.

A terminal resistor of the present invention is a chip-type. In the chip-type terminal resistor, there are L and C parasites. The high frequency electromagnetic energy generated by the resonance of the L and C is absorbed by an insulator which is provided in the vicinity of a chip type terminal resistor, and which has a larger dielectric loss angle. By absorbing the high frequency electromagnetic energy, no reflection at the bus terminal occurs. Thus, distortion of the digital signal transmitting bus is reduced.

Fukaya is silent about using a coating material having a larger dielectric loss angle than the substrate. The Examiner merely states that one of ordinary skill would have been motivated to use such material since substrate materials and circuit boards are commonly made of low loss materials. However, the Examiner does not explain how one of ordinary skill would have been motivated to use an insulator of a larger dielectric loss angle than the substrate.

The purpose, configuration, and effect of *Fukaya* are completely different from the invention, and *Fukaya* does not disclose an insulator having larger dielectric loss angle than the insulative substrate as recited in claims 1, 6, 7 and 13.

Accordingly, withdrawal of the rejection based on *Otsuka* in view of *Fukaya* of claims 1-2, 6-8 and 13-15 is hereby solicited.

In view of the above remarks, Applicants submit that that the claims are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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